

1. (original): A method for forming a functional layer on an inorganic or organic substrate, wherein

a) a low-temperature plasma, a corona discharge, high-energy radiation and/or a flame treatment is caused to act on the inorganic or organic substrate,

b) 1) at least one activatable initiator or 2) at least one activatable initiator and at least one ethylenically unsaturated compound is/are applied in the form of a melt, solution, suspension or emulsion to the inorganic or organic substrate, there being incorporated in the activatable initiator and/or the ethylenically unsaturated compound at least one function-controlling group which results in the treated substrate's acquiring desired surface properties, and

c) the coated substrate is heated and/or is irradiated with electromagnetic waves, the substrate thereby acquiring the desired surface properties.

2. (original): A method according to claim 1, wherein the function-controlling group is composed as follows:

- i) a hydrophilic or hydrophobic group for controlling hydrophilicity/hydrophobicity,
- ii) an acid, neutral or basic functional group for controlling acid/base properties,
- iii) a functional group having high or low incremental refraction, for controlling the refractive index,
- iv) a functional group having an effect on the growth of cells and/or organisms, for controlling biological properties,
- v) a functional group having an effect on combustibility, for controlling flame-retardant properties, and/or
- vi) a functional group having an effect on electrical conductivity, for controlling anti-static properties.

3. (currently amended): A method according to claim 1 or 2, wherein as hydrophilic group there is used a polar group, such as an alcohol, ether, acid, ester, aldehyde, keto, sugar, phenol, urethane, acrylate, vinyl ether, epoxy, amide, acetal, ketal, anhydride, quaternised amino, imide, carbonate or nitro group, a salt of an acid, or a (poly)glycol unit.

4. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as the~~ hydrophilic group there is ~~used~~ chosen from acrylic acid, acrylamide, acetoxystyrene, acrylic anhydride, acrylsuccinimide, allyl glycidyl ether, allylmethoxyphenol, polyethylene glycol (400) diacrylate, diethylene glycol diacrylate, diurethane dimethacrylate, divinyl glycol, ethylene glycol diglycidyl ether, glycidyl acrylate, glycol methacrylate, 4-hydroxybutyl methacrylate, 2-hydroxyethyl acrylate, 2-hydroxyethyl methacrylate, N-(2-hydroxypropyl)methacrylamide, methacryloxyethyl glucoside, nitrostyrene, sulfoethyl methacrylate, sodium salt of 3-sulfopropyl acrylate, 4-vinylbenzoic acid, vinyl methyl sulfone, vinylphenylacetate or vinylurea.

5. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as the~~ hydrophobic group ~~there is used~~ a non-polar group, ~~such as~~ chosen from a branched or unbranched alkane, alkene, alkyne, partially or fully halogenated alkane or alkene or alkyne, alkylated amine, linear or branched silane or siloxane group or a partially or fully halogenated aromatic or non-aromatic cyclic group.

6. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as the~~ hydrophobic group ~~there is used~~ chosen from tert-butyl acrylate, styrene, butyl trimethoxysilane, cyclohexyl acrylate, decanediol dimethacrylate, divinylbenzene, 2-(2-ethoxyethoxy)ethyl acrylate, 1H,1H-heptafluorobutyl acrylate, benzyl acrylate, 1H,1H,7H-dodecafluoroheptyl methacrylate, naphthyl acrylate, pentabromophenyl acrylate, trifluoroethyl acrylate or vinyltriphenylsilane.

7. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a the~~ functional group controlling acid/base properties ~~there is used~~ chosen from a carboxylic acid, sulfonic acid, phosphoric acid, sulfuric acid, phenolic acid or amino acid group or an amino, pyridine, pyrimidine, piperidine, pyrrole or imidazole group.

8. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a the~~ functional group controlling acid/base properties ~~there is used~~ chosen from allylamine, 2-aminoethyl methacrylate, 4-vinylpyridine, vinylpyrrolidone, vinylimidazole, morpholinoethyl acrylate, acrylic acid, 2-propene-1-sulfonic acid, sorbic acid, cinnamic acid or maleic acid.

9. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling the refractive index ~~there is~~ chosen from ~~used~~ a benzyl group, a partially or fully halogenated benzyl group or a partially or fully halogenated alkane or alkene or alkyne group.

10. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling the refractive index ~~there is~~ chosen from ~~used~~ benzyl acrylate, 1H,1H,7H-dodecafluoroheptyl methacrylate, 1H,1H-heptafluorobutyl acrylate or trifluoroethyl acrylate.

11. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling biological properties ~~there is~~ chosen from ~~used~~ a group having anti-fouling properties, such as copper(II) methacrylate, dibutyltin maleate, tin(II) methacrylate or zinc dimethacrylate.

12. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling biological properties ~~there is~~ chosen from ~~used~~ a group that promotes the growth of biological systems, wherein the group that promotes the growth of biological systems is chosen from ~~such as~~ a succinimide, glucoside or sugar group.

13. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 12, wherein as a group that promotes the growth of biological systems ~~there is~~ used chosen from N-acyloxysuccinimide or 2-methacryloxyethyl glucoside.

14. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling flame-retardant properties ~~there is~~ chosen from ~~used~~ a fully or partially chlorinated or brominated alkane or nitrogen- or phosphorus-containing group.

15. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling flame-retardant properties ~~there is~~ chosen from ~~used~~ tribromoneopentyl methacrylate, bis(2-methacryloxyethyl) phosphate or monoacryloxyethyl phosphate

16. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling anti-static properties ~~there is~~ chosen from ~~used~~ a tertiary amino, ethoxylated amino, alkanol amide, glycerol stearate, sorbitan or sulfonate group.

17. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 2, wherein ~~as a~~ the group controlling anti-static properties ~~there is chosen from~~ used 2-diisopropylaminoethyl methacrylate, 3-dimethylaminoneopentyl acrylate or oleylbis(2-hydroxyethyl)amine, stearyl acrylate, or vinyl stearate.

18. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein the inorganic or organic substrate is or comprises a synthetic or natural polymer, a metal oxide, a glass, a semi-conductor, quartz or a metal.

19. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 18, wherein the organic substrate is or comprises a homopolymer, block polymer, graft polymer and/or copolymer and/or a mixture thereof.

20. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 19, wherein the organic substrate is or comprises a polycarbonate, polyester, halogen-containing polymer, polyacrylate, polyolefin, polyamide, polyurethane, polystyrene, polyaramide, polyether or polysiloxane / silicone.

21. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein the initiator is a compound or combination of compounds from the classes of the peroxides, peroxodicarbonates, persulfates, benzpinacols, dibenzyls, disulfides, azo compounds, redox systems, benzoin, benzil ketals, acetophenones, hydroxyalkylphenones, aminoalkylphenones, acylphosphine oxides, acylphosphine sulfides, acyloxyiminoketones, peroxy compounds, halogenated acetophenones, phenyl glyoxylates, benzophenones, oximes and oxime esters, thioxanthenes, ferrocenes, titanocenes, sulfonium salts, iodonium salts, diazonium salts, onium salts, borates, triazines, bisimidazoles, polysilanes and dyes, and also corresponding coinitiators and/or sensitisers.

22. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein the initiator has at least one ethylenically unsaturated group, ~~especially a vinyl, vinylidene, acrylate, methacrylate, allyl or vinyl ether group.~~

23. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 22, wherein the ethylenically unsaturated compound is used in the form of a monomer, oligomer and/or polymer.

24. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 23, wherein the ethylenically unsaturated compound is a mono-, di-, tri-, tetra- or poly-functional acrylate, methacrylate or vinyl ether.

25. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein ~~as the plasma is run in a gas and the gas there is used~~ air, water, inert gas, reactive gas or a mixture of the afore-mentioned gases.

26. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein the in the melt, solution, suspension or emulsion liquid used in method step b) contains the initiator(s) in a concentration of from 0.01 to 20 %, ~~preferably from 0.1 to 5 %~~.

27. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein the liquid melt, solution, suspension or emulsion used in method step b) contains the unsaturated compound(s) in a concentration of from 0.1 to 30 %, ~~preferably from 0.1 to 10 %~~.

28. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein the liquids melt, solution, suspension or emulsion used in method step b) additionally comprise other substances, ~~for example~~ chosen from defoamers, emulsifiers, surfactants, anti-fouling agents, wetting agents and other additives customarily used in the coatings industry.

29. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein the thickness of the applied ~~layer~~ coating in the dry state ranges from a monomolecular layer up to 2 mm, ~~preferably from 2 nm to 1000 µm, especially from 2 nm to 1000 nm~~.

30. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein in method step c) irradiation is carried out using sources which emit electromagnetic waves of wavelengths in the range from 200 nm to 20 000 nm or by means of electron beams, optionally preceded by a drying step.

31. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein in method step c) irradiation is effected over the whole area or parts thereof.

32. (currently amended): A method according to ~~at least one of the preceding claims~~ claim 1, wherein in method step c) partial irradiation is effected and unexposed material is then removed.

33. (currently amended): A substrate having a functional layer, obtainable by a method according to ~~at least one of the preceding claims~~ claim 1.

34. (currently amended): A product that has been provided with a coating in accordance with ~~any one of the preceding claims~~ claim 1.

35. (cancelled).